LESSON 4.5

NAME _____ DATE _____

Practice with Examples

For use with pages 229–235

GOAL **Use congruent triangles to plan and write proofs**

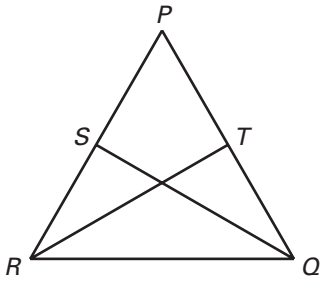
EXAMPLE 1 Planning and Writing a Proof

Given: $\overline{PR} \cong \overline{PQ}$, $\overline{SR} \cong \overline{TQ}$

Prove: $\overline{QS} \cong \overline{RT}$

Plan for Proof: $\overline{QS}$ and $\overline{RT}$ are corresponding parts of $\triangle PQS$ and $\triangle PRT$ and also of $\triangle RQS$ and $\triangle QRT$.

The first set of triangles is easier to prove congruent than the second set. Then use the fact that corresponding parts of congruent triangles are congruent.



SOLUTION

Statements	Reasons
1. $\overline{PR} \cong \overline{PQ}$	**1.** Given
2. $PR = PQ$	**2.** Definition of congruence
3. $PR = PS + SR$	**3.** Segment Addition Postulate
4. $PQ = PT + TQ$	**4.** Segment Addition Postulate
5. $PS + SR = PT + TQ$	**5.** Subsitution
6. $\overline{SR} \cong \overline{TQ}$	**6.** Given
7. $SR = TQ$	**7.** Definition of congruence
8. $PS = PT$	**8.** Subtraction property of equality
9. $\overline{PS} \cong \overline{PT}$	**9.** Definition of congruence
10. $\angle P \cong \angle P$	**10.** Reflexive Property of Congruence
11. $\triangle PQS \cong \triangle PRT$	**11.** SAS Congruence Postulate
12. $\overline{QS} \cong \overline{RT}$	**12.** Corresponding parts of congruent triangles are congruent.

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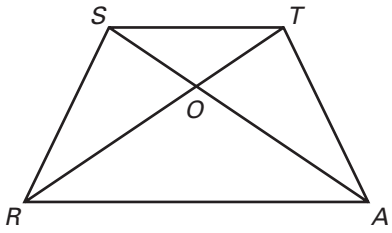
Exercises for Example 1

Use the given information to prove the desired statement.

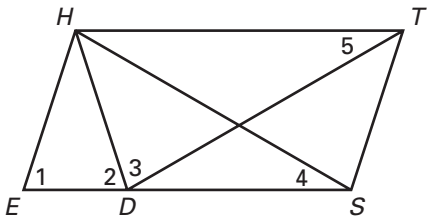
1. Given: $\overline{RT} \cong \overline{AS}$, $\overline{RS} \cong \overline{AT}$

Prove: $\angle TSA \cong \angle STR$



2. Given: $\angle 1 \cong \angle 2 \cong \angle 3$, $\overline{ES} \cong \overline{DT}$

Prove: $\angle 4 \cong \angle 5$

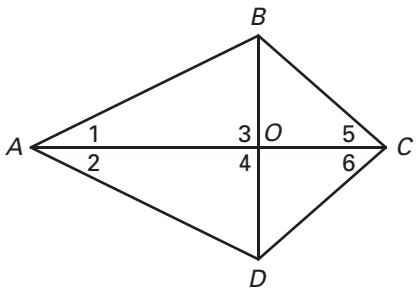


EXAMPLE 2 Using More than One Pair of Triangles

Given: $\angle 1 \cong \angle 2$, $\angle 5 \cong \angle 6$

Prove: $\overline{AC} \perp \overline{BD}$

Plan for Proof: It can be helpful to reason backward from what is to be proved. You can show that $\overline{AC} \perp \overline{BD}$ if you can show $\angle 3 \cong \angle 4$. Notice that $\angle 3$ and $\angle 4$ are corresponding parts of $\triangle ABO$ and $\triangle ADO$. You can prove $\triangle ABO \cong \triangle ADO$ by SAS if you first prove $\overline{AB} \cong \overline{AD}$. $\overline{AB}$ and $\overline{AD}$ are corresponding parts of $\triangle ABC$ and $\triangle ADC$. You can prove $\triangle ABC \cong \triangle ADC$ by ASA.



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SOLUTION

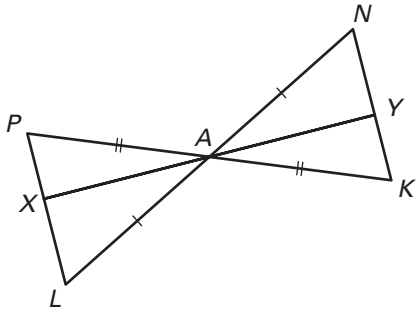
Statements	Reasons
1. $\angle 1 \cong \angle 2,\ \angle 5 \cong \angle 6$	**1.** Given
2. $\overline{AC} \cong \overline{AC}$	**2.** Reflexive Property of Congruence
3. $\triangle ABC \cong \triangle ADC$	**3.** ASA Congruence Postulate
4. $\overline{AB} \cong \overline{AD}$	**4.** Corresponding parts of congruent triangles are congruent.
5. $\overline{AO} \cong \overline{AO}$	**5.** Reflexive Property of Congruence
6. $\triangle ABO \cong \triangle ADO$	**6.** SAS Congruence Postulate
7. $\angle 3 \cong \angle 4$	**7.** Corresponding parts of congruent triangles are congruent.
8. $\overline{AC} \perp \overline{BD}$	**8.** If 2 lines form congruent adjacent angles, then the lines are $\perp$.

Exercises for Example 2

In Exercises 3 and 4, use the given information to prove the desired statement.

3. Given: $\overline{PA} \cong \overline{KA},\ \overline{LA} \cong \overline{NA}$

Prove: $\overline{AX} \cong \overline{AY}$



4. Given: $\angle DAL \cong \angle BCM$, $\angle CDL \cong \angle ABM$, $\overline{DC} \cong \overline{BA}$

Prove: $\overline{AL} \cong \overline{CM}$